UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—Mr. S. H. Vines, M.A., D.Sc. Lond., F.R.S., and Prof. J. H. Poynting, M.A., have been approved for the degree of Doctor in Science.

Fortunately for research in pathology, the opposition to the acceptance of the John Lucas Walker Studentship proved abortive, and it was accepted by a majority of nearly five to one last Thursday.

Dr. Michael Foster, Sec.R.S., has been appointed the University representative on the Council of the Marine Biological Association till the next annual meeting of the Association.

The following Entrance Scholarships and Exhibitions in Natural Science will be open for competition in the coming summer:—Downing College: Natural Science, June 1, 50*l*. per annum; Peterhouse: Mathematics, Chemistry, and Physics, 40*l*. to 60*l*. per annum; date to be announced in June; non-Collegiate students: Physical Science, July, in connection with Oxford and Cambridge Schools Examination Board, 50 guineas per annum for three years, tenable at Oxford or Cambridge, open to non-Collegiate students of not more than one term standing, or to persons not yet in residence. Apply to the Rev. F. G. Howard, Cambridge.

SCIENTIFIC SERIALS

American Journal of Mathematics, vol. ix. No. 2, January.—The number opens with a continuation of Mr. Greenhill's memoir, wave-motion in hydrodynamics, in which is discussed wave-motion in the following cases: § 21, across a channel with sides sloping at any angle; § 22, against a uniformly-sloping shore; § 24, in a cone; § 25, in a cylinder; and § 23 contains an algebraical solution of waves against a shore.—Prof. Sylvester's lectures on the theory of reciprocants give notes of lectures xvii. to xxiv., with an extract from a letter of M. Halphen in which the existence of *invariants* in general is established *a priori*; this is given as introductory to the theory of differential invariants.—A memoir in the theory of numbers, by A. S. Hathaway, contains an historical introduction of interest. The second part considers fundamental principles and definitions, then a problem and the consequences of its solution, and then turns the question of ideal solution of the problem into the question of the establishment of a given theory of ideals; the demonstrations are left for the reader to supply. The third part is occupied with a rigorous establishment of the theory of ideals indicated in the second part.—The next paper, on a theorem respecting the singularities of curves of multiple curvature, by H. B. Fine, is a generalisation of a portion of a previous paper (vol. viii. No. 2) by the same writer.—The number closes with two short notes—one on pencils of conics, by H. D. Thompson (let the eight points in which a conic intersects a quartic be divided into two groups of four, and a conic be passed through each group: the two residual—four-point—groups lie on a conic; an exceptional case in Cayley's theorem, which had been overlooked by the author, is mentioned and references given to where it is discussed); the other consists of observations on the generating functions of the theory of invariants, by Capt. P. A. Macmahon.

Notes from the Leyden Museum, edited by Dr. F. A. Jentink, vol. ix. No. 1, January 1887, contains, among other memoirs, the following:—J. Buttikofer, on a collection of birds made in the highlands of Padang, in West Sumatra, by Dr. C. Klaesi. This paper gives details of 189 birds in this collection, and is prefaced by a short history of the various published accounts of the birds of Sumatra from the first memoir by Sir Stamford Raffles in 1822. The only new species described is a swift (*Hirundinapus klaesii*).—Dr. R. Horst, descriptions of earthworms. Describes as new a gigantic earthworm from a coffee-plantation in Sumatra, *Moniligaster houtenii*; and also from the same country, *Rhinodrilus tenkatei*, n.sp.—Dr. Th. W. van Lidth Jeude, on a collection of reptiles and fishes from the West Indies. Describes three new lizards and a new fish taken during the Dutch Expedition to the West Indies.—There are also ten papers on new or little-known insects.

Rendiconti del R. Istituto Lombardo.—Results of the observations made by Dr. M. Rajna at the Brera Observatory on the diurnal oscillations of magnetic declination during the year 1886, communicated by E. G. V. Schiaparelli. These observations were taken as in previous years at 8 a.m. and 2 p.m., the diurnal variation being obtained by determining the difference in time between the two periods. The monthly averages thus determined and tabulated show for the whole year a mean of 6′·72.

Bulletin de l'Académie Royale de Belgique, January.—On some curious effects of molecular forces in contact with a solid and a liquid, by G. Van der Mensbrugghe. Some experiments are described tending to illustrate the expansive force possessed by the contact layer between a solid and a liquid, and the existence of which the author claims to have been the first to demonstrate.—On Fermat's last theorem, by P. Mansion. It is shown that, if there exist integers x, y, z, verifying Fermat's relation $x^n + y^n = z^n$, where $x < y < z$, then not only the middle term, y, as shown by de Jonquières, but also the largest, z, and the smallest, x, are compound numbers.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 3.—"Preliminary Note on a Balanoglossus Larva from the Bahamas." By W. F. R. Weldon.

A preliminary account was given of the degradation of a Balanoglossus larva, found during the latter half of last year in the deep waters round the Bahamas. Up to the period of the development of a pair of gill-slits, this larva resembled, except in its pelagic habit, the larva found in Carolina by Bateson. After this stage, degradation set in, resulting in the atrophy of the two posterior pairs of body cavities, and the reduction of that in the præoral lobe: the gills and notochord, together with the greater part of the nervous system, disappeared, and the trunk diminished in size. The result was a bell-shaped creature, with a large præoral lobe, on the sides of which was developed a curious arrangement of tentaculiferous grooves. The alimentary canal remained functional, but the creature gradually shrivelled up, and (probably) died.

"Studies of some New Micro-Organisms obtained from Air." By G. C. Frankland and Dr. Percy F. Frankland.

In previous communications to the Royal Society by one of the authors,[1] details have been given of a number of experiments on the presence of micro-organisms in the atmosphere. In these investigations a solid culture medium was employed, which not only greatly facilitated their enumeration, but also presented them in an *isolated* condition. In this manner the authors have met with a number of different varieties of aërial micro-organisms, which have hitherto remained either unknown or undescribed. They have therefore undertaken the characterisation of a number of these organisms by growing them in various cultivating media and observing the different appearances which they subsequently exhibit, by studying them microscopically in stained and unstained preparations, and by cultivating them on gelatine-plates, and describing the colonies to which they give rise. They have likewise made a number of drawings to illustrate the appearances which they present under the various examinations to which they have submitted them. To further facilitate their identification the authors have provisionally given them names, by which they have endeavoured to represent some of their most striking individualities.

The authors venture to hope that by thus characterising some of the organisms most prevalent in the atmosphere, they may prove of assistance in those investigations which have for their object the study of the particular physiological changes which are brought about by specific micro-organisms.

The following is a list of the micro-organisms described:—

Micrococcus carnicolor
,, albus
,, gigas
,, chryseus
,, candicans
Streptococcus liquefaciens
Sarcina liquefaciens
Bacillus aurescens siccus
,, aureus
,, citreus
Bacillus plicatus
,, chlorinus
,, polymorphus
,, profusus
,, pestifer vermicularis
,, subtilis minor
,, subtilis cereus
Saccharomyces rosaceus
,, liquefaciens
Mycelium fuscum.

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[1] (1) "The Distribution of Micro-Organisms in Air," Roy. Soc. Proc. vol. xl. p. 509; (2) "A New Method for the Quantitative Estimation of the Micro-Organisms present in the Atmosphere," *ibid.* vol. xli. p. 443; (3) "Further Experiments on the Distribution of Micro-Organisms in Air by Hesse's method," *ibid.* p. 446.

In addition to these varieties a description has been given for the sake of comparison of some aërial micro-organisms which were obtained by one of the authors from Dr. Koch's laboratory in Berlin. These are—

Micrococcus rosaceus
Sarcina lutea
,, aurantiaca
Bacillus subtilis
,, (Micrococcus) prodigiosus.

Linnean Society, March 3.—Mr. W. Carruthers, F.R.S., President, in the chair.—The following gentlemen were elected Fellows of the Society:—B. S. Dyer, Right Hon. Sir E. Fry, S. T. Klein, C. Mariès, E. S. Marshall, R. Morgan, J. B. Stone, and A. W. Tait.—A paper was read by Mr. Alfred W. Bennett on the genetic affinities and classification of the Algæ. He referred to Prof. Sachs's scheme as based on the mode of reproduction and degree of complexity of the sexual process alone; this being the most important factor in the life-history of the plant. Supporting Sachs to a certain extent, he nevertheless differs from him, and rather agrees with Prof. Fischer's view of Algæ and Fungi running in distinct series, while he diverges from both writers as to the descent, relations, and grouping of the Algæ. He believes arrest of development has had an important influence in many presumed deviations among the groups in question. He avers that retrogression may take the form of the suppression of either the vegetative or the reproductive organs, and whichever predominates or progresses leaves the other feeble or degenerate. If the principle advocated by the author holds good, it leads towards the almost abandoned divisions of the Algæ into the green, the red, and the brown,—Chlorosporeæ, Rhodosporeæ, and Phæosporeæ. It would appear as if at an early period in the development of the simplest form of vegetative life, three kinds of cell-contents were represented, a colourless, a blue-green, and a pure green. Based thereon are the author's three great divisions:—I. *Schizomycetes*, forms entirely destitute of chlorophyll, and adapted to carry on only a parasitic existence; II. *Chroococcaceæ*, unicellular organisms, with cell-contents composed of watery blue-green endochrome diffused through the protoplasm, without distinct chlorophyll grains, starch grains, or nucleus; III. *Protococcaceæ*, characterised by cells possessing a nucleus, starch grains, pure chlorophyll identical with that of higher plants, and in certain states a true cell-wall of cellulose. The (I.) Schizomycetes lead to the Fungi, which are not discussed by the author. The (II.) Chroococcaceæ pass through the Oscillarieaceæ to Nostocaceæ. The (III.) Protococcaceæ are the great derivatives of the Algal group. Hence three great lines of descent are indicated. (1) The Diatoms are regarded as of remote origin, very low in the scale. (2) The Cœobiæ comprise a series through Sorastreæ to Volvox and Allies. (3) The Eremobiæ as a line of descent pass to the Multinucleatæ, *e.g.* Siphoneæ with gigantic cells. Thence cell-division originating, proceeded to the Confervoideæ-isogamæ, the Conferva group. From these in three different lines have sprung: (*a*) the Conjugatæ, including Zygnemids and Desmids, a retrogressive group; (*b*) the brown seaweeds adapted to deep sea life, Phæosporeæ, terminating in Fucaceæ; and (*c*) the Confervoideæ-heterogameæ, at the extreme of which the Coleochætæ are reached. The Coleochætæ lead direct to the red seaweeds, or Florideæ, a natural group with great variety in development of the sexual organs. By arrest of development branches proceed on the one hand through Nemalieæ to the Ulvaceæ, while on the other at a tangent from true Algæ were evolved the Characes, the Mosses, the Gymnosperms, and lastly the higher Angiosperms, or flowering plants.—A paper was read on the disease of Colocasia in Jamaica, by Mr. G. Massee and Mr. D. Morris. The negroes of the West Indies give the name "Cocoes" to the main stem and shoots of a species of Aroid. This forms a wholesome food, and is said to be preferable to yams and sweet potatoes. A blight arises in the tubers similar to the potato-disease; and as shown by the authors this is produced by a fungus belonging to the genus Peronospora, a new species named by them *P. trichotoma*. Instructions are given as to remedial measures, an important one being the absolute necessity of badly affected plants being wholly destroyed.

Physical Society, February 26.—Prof. W. G. Adams, Vice-President, in the chair.—The resolution passed at the meeting on February 12, providing greater facilities to persons being abroad for qualifying for membership of the Society, was unanimously confirmed.—Prof. W. Stroud and Mr. A. S. Gulbenkian were elected Members of the Society.—Mr. James Swinburne read a note on Prof. Carey Foster's method of measuring the mutual induction of two coils. The author described an apparatus devised last summer for measuring mutual induction by a null method, thus dispensing with a ballistic galvanometer. The induction in the secondary coil is balanced by an opposite effect produced by a variable known fraction of the primary current passing through one wire of a double-wound coil of known mutual induction, the other wire of which is joined in series with the secondary coil and galvanometer. In a preliminary trial, using an ordinary reflecting galvanometer, it was found that instead of no deflection being observed, two kicks in opposite directions occurred when there was iron in the circuit. A new galvanometer, with heavy needle, is now being constructed to overcome this difficulty. A null method of finding the ohm by means of a differentially-wound, heavy-needle galvanometer is suggested in the latter part of the note. Prof. Ayrton pointed out that Prof. Foster's method does not require readings on a ballistic galvanometer, and mentioned that in practice it is greatly superior to those given in Maxwell and the ordinary textbooks. The chief drawback is the necessity of having large condensers of accurately known capacity where large coefficients are concerned. A large number of experiments have been carried out at the Central Institution by Mr. Sumpner with very satisfactory results. Prof. Adams concurred in Prof. Ayrton's statement regarding the difficulties in using Maxwell's methods in practice, and expressed his satisfaction with the great simplicity of Prof. Foster's method.—On the determination of coefficients of mutual induction by means of the ballistic galvanometer and earth inductor, by R. H. M. Bosanquet. The methods described depend on two measurements of the throws of a ballistic galvanometer: (1) that produced by the sudden rotation of a coil (the constants of which are accurately known) through 180° about a vertical axis; and (2) that produced by the mutual induction to be measured when a current of known strength is started in the primary circuit. The earth induction-coil is permanently joined in series with the ballistic galvanometer and secondary coil, and the primary current measured by an absolute tangent galvanometer of the Helmholtz pattern. If Q_0 and Q be the quantities of electricity which pass through the ballistic galvanometer in the two experiments, then

$$Q_0 = \frac{2NAH}{R},$$

where NA is the effective area of the inductor, and

$$Q = \frac{MC}{R},$$

where $C = GH \tan\theta$.

Hence
$$\frac{Q}{Q_0} = \frac{MG\tan\theta}{2NA} = \frac{\alpha}{\beta},$$

where α and β are the throws of the ballistic galvanometer. From the above we get

$$M = \frac{\alpha}{\beta}\,\frac{2NA}{G\tan\theta}.$$

A modification to be used when M or R are very large is also described. Numerical results obtained are given, from which it is inferred that Maxwell's formulæ for calculating the mutual induction of two circular coils cannot be applied where the distance between their central planes is at all comparable with their radii. Experiments on an A Gramme dynamo gave very irregular results when the currents were small, owing to the subpermanent magnetism of the machine. Further uses of the method are suggested, such as the absolute determination of capacity and resistance. Remarks on the subject were made by Prof. Carey Foster and Mr. Swinburne, and Prof. Ayrton replied to Mr. Swinburne's contention that Prof. Foster's method was not independent of observations of a ballistic galvanometer (since capacities are determined by their means) by pointing out that where accurate standards exist it is quite legitimate to base other absolute measurements on them.—Prof. Reinold then read an abstract of a paper on the continuous transition from the liquid to the gaseous state of matter at all temperatures, by Prof. W. Ramsay and Dr. Sydney Young. The authors find the relation between pressure and temperature of gases and liquids at constant volume expressible by $p = bt - a$ where b and a are constants, and therefore conclude that the *isochors* (*i.e.* curves connecting p and t for constant volume) are straight lines. At temperatures below the critical point, the isotherm, during passage from the gaseous to the liquid state, is a serpentine curve intersected by the horizontal line of vapour-pressure corresponding with that temperature, the two areas between the curve and straight line being equal. By experiment and extrapolation the authors find the loci of the apices of the serpentine curves corresponding with different temperatures, to intersect at the critical point. The above results are proved for ether and carbon dioxide, and the authors believe them to be true for all stable substances. Prof. Rücker remarked that if similar relations hold for liquids and solids, the triple point of intersection would be of immense interest. Prof. Perry, whilst regarding the results as of vast importance, thought the curves and calculations should be very carefully discussed before being finally accepted.

EDINBURGH

Royal Society, February 21.—Rev. Prof. Flint, Vice-President, in the chair.—In a paper on the effect of pressure on the maximum density point of water, Prof. Tait replied to criticisms made upon his results by Grimaldi.—Dr. J. Murray gave a re-determination of the mean height of the land of the globe above sea-level. He obtains a value higher than that obtained by previous observers.—Prof. Tait read a note on the effects of explosives. He pointed out that within a certain distance from the centre of explosion the speed of ejected matter (air, &c.,) is greater than that of sound. Hence within this distance there is great danger of damage to objects from impulsive pressure.—Dr. Traquair read a supplementary report on fossil Ganoidei collected in Eskdale and Tiddesdale.—Sir W. Thomson submitted a paper in continuation of his paper read before the last meeting on the equilibrium of a gas under its own gravitation alone.

PARIS

Academy of Sciences, March 7.—M. Janssen in the chair.—Determination of the constant of aberration: first and second processes (concluded), by M. Lœwy. The relations being known between the ecliptical and equatoria lco-ordinates, the equation is here determined by means of which for a couple of stars without aberration the epoch may be calculated, when both are at the same altitude above the horizon.—On a theorem of M. Liapounoff respecting the equilibrium of a fluid mass, by M. H. Poincaré. By considerations borrowed from electrostatics, a simplification is here offered of the demonstration recently published by M. Liapounoff in the *Mémoires* of the University of Kharkoff.—On the direct fixation of the gaseous nitrogen of the atmosphere by vegetable soils with the aid of vegetation, by M. Berthelot. Having already described the results of the experiments made at Meudon on the fixation of atmospheric nitrogen by certain argillaceous and vegetable soils, apart from the action of vegetation, the author here gives the results of the experiments simultaneously carried on with the aid of vegetation, and under the ordinary conditions suitable for the natural development of plants. In this case the amount fixed was only 4·67 and 7·58 grms., as compared with 12·7 and 23·15 in the absence of plants. From these experiments important conclusions are drawn with regard to the rapid exhaustion of the soil under the prevalent systems of forced culture.—On the great movements of the atmosphere, and on M. Mascart's second note of February 28, by M. Faye. The author replies to the objections urged against, and repeats the arguments already advanced by him in support of, the theory he has formulated on this subject based on fifteen years' observations of atmospheric phenomena.—On the magnetic effects of the recent earthquakes, by M. Mascart. A more careful study of the curves recorded at the Observatory of Nantes shows that the magnetic effects observed at Paris, Lyons, and Perpignan, were also felt in the west of France, although here the oscillations were much feebler.—On the determination of the poles in magnets, by M. Mascart. For the method here described it is claimed that it involves no hypothesis on the magnetic state of the bars, and is free from the objections urged against the other methods now in use.—On the nutritive properties of latex, and on the aquiferous apparatus of *Calophyllum* as described by M. Vesque, by M. A. Trécul.—On the frequency and duration of showers, by M. Hervé Mangon. The results are here tabulated of the pluviometric observations taken at Paris during the years 1860–70 with the pluvioscope invented by the author. The rainfall here recorded is higher than that indicated by other instruments, which mostly neglect slight showers under 0·10 or 0·15 mm., which nevertheless represent from 1000 to 1500 kgrms. of water per hectare.—Letter on atmospheric eddies (M. Weyher's experiments, &c.), by M. D. Colladon.—Report on M. Léon Roque's note respecting a new metronome, based on the isochronism of the slight oscillations of the pendulum, by M. Fizeau. The Commission appointed to examine this instrument reports favourably on the principle of its construction as at once simple and practical, and considers that it is likely to be of service to the art of music.—Report on MM. Bérard and Léauté's memoir on the means of diminishing momentary increase of velocity in machinery furnished with governors acting indirectly, by the Commissioners, MM. Lévy, Marcel Deprez, Sarrau, and Phillips. The report considers that MM. Bérard and Léauté have arrived at a simple and complete solution of the problem how best to control the irregular action of machinery, and that, while specially useful for the manufacture of gunpowder, their apparatus will be found generally applicable to all mechanical work.—Note on the earthquake of February 23 in Italy, by M. F. Denza. General conclusions are given regarding the character, extent, duration, intensity, &c., of this disturbance, derived from reports received from all quarters at the Observatory of Moncalieri.—Propagation of the earthquake in one of the mines at Anzin (Nord), by M. François. The *tromomètre* (seismometer) set up in this mine at a depth of 250 metres two months ago recorded, for the first time, extraordinary vibrations between 6.15 and 6.30 a.m. on February 23.—Reports on the same phenomenon, by MM. A. Issel (Porto Maurizio), M. E. de Rossi (Rome), and Perrotin (Nice).—Observations on M. Donnadieu's recent note on the winter incubations of Phylloxera, by M. Balbiani. In reply to M. Donnadieu, the author maintains his views regarding the hibernation of this parasite.—Observations of Barnard's Comet II. and of Palisa's new planet made at the Observatory of Algiers with the 0·50 m. telescope, by MM. Trépied and Rambaud.—Distribution in latitude of the solar phenomena during the year 1886, by M. P. Tacchini. From the tabulated results of the year's observations it appears that the eruptions, spots, and faculæ, were more numerous in the southern, and the protuberances in the northern, solar hemisphere. The latter occurred in all zones, whereas the other phenomena were almost entirely confined to the region between the equator and ± 40°.—On the rectifications of Maclaurin's trisector curve by means of the elliptical integrals, by M. G. de Longchamps.—On the laws of solution, by M. H. Le Chatelier. This is a reply to MM. Chancel and Parmentier's recent communication to the effect that the author's law of solution is not general, and in certain cases is opposed to observed facts.—On some formulæ relating to saline solutions, by M. Duhem.—On a particular case of solution, by M. F. Parmentier.—On an acid obtained by the action of potassa on a mixture of acetone and chloroform, by M. R. Engel. The compound substance here described has been obtained by M. Willgerodt by treating acetone with chloroform and a small quantity of solid potassa. Its formula is $C_4H_7OCl_3$, and it takes the name of acetone-chloroform.—Synthetical researches on some derivatives of diphenyl, by M. P. Adam.—Note on active camphene and ethyl-borneol, by MM. G. Bouchardat and J. Lafont.—Action of the bibromide of ethylene on the alkaline alcoholates: preparation of acetylene, by M. de Forcrand.—On the spores of *Bacillus anthracis*, by M. S. Arloing. It is shown that these spores are really killed by the light of the sun.—A new method of attenuating the virus of ovine pox, by M. P. Pourquier. The experiments here described yield an unlimited supply of an attenuated virus or vaccine, with which sheep may be safely and efficiently inoculated.—Researches on the structure and development of the cysts in *Echinorhynchus angustatus* and *E. proteus*, by M. R. Kœhler.—On the food of the sardine, by MM. G. Pouchet and J. de Guerne. It is shown that the food of the sardine varies according to circumstances, and does not depend, as recently asserted, on the animal refuse drifting from the Newfoundland fisheries.—New researches on the mode of formation of double monsters, by M. Camille Dareste.—On the variations of structure in the carboniferous porphyries of Renfrewshire, by M. A. Lacroix.—On the minerals associated with the basalt of Prudelles, near Clermont-Ferrand, by M. Ferdinand Gonnard. The prevailing mineral disseminated among these as among most of the Puy-de-Dôme basalts is a christianite apparently confused by the old mineralogists with mesotype, or vaguely described under the name of zeolite.—Researches on the contraction of the terrestrial radius since the formation of the solid crust, by M. A. de Lapparent. Several arguments are adduced against the general theory that the radius of the globe has diminished by one-half since the gneiss or oldest rock formation.

BERLIN

Physiological Society, February 11.—Prof. du Bois-Reymond in the chair.—Dr. König spoke on acuteness of hearing and its estimation by means of tuning-forks, the sound of which gradually died away. He laid stress on the distinction between acuteness of seeing and acuteness of hearing, the latter of which was represented by the time from the beginning of hearing a tuning-fork struck till no sound from it was any longer perceived. It was now customary to say when one person could hear a certain tuning-fork for 100 seconds after it had been struck, and another could hear the same tuning-fork, struck at the same intensity, for only 50 seconds, that the second had only half the acuteness of hearing possessed by the first. In point of fact, such a statement was not accurate, seeing that the amplitudes of a vibrating tuning-fork declined in geometrical progression. It was only in very special circumstances that the specification of the amount of acuteness of hearing, as commonly employed, could be correct. As an empirical method of measurement according to a conventional standard, the expressions a half, a quarter, or whatever be the measure, of acuteness of hearing would be permissible, if in such cases the same tuning-fork were always applied, and it was always struck with the same intensity. To come to an understanding on this point was the business of practical aurists. During the animated discussion which followed this address, Prof. du Bois-Reymond produced an apparatus in which an equal amplitude of vibration in a tuning-fork was obtained by placing between the prongs of the fork a revolving elliptical disk of such dimensions that the small axis left the prongs in their natural position, while the large axis forced them apart from one another. The large axis having been put in, and the disk rapidly turned through 90°, the fork commenced to vibrate, and with each impulse the amplitude was the same.—Prof. Zuntz reported the results of the experiments, partly instituted in conjunction with Herr Potthast, respecting the alimentary values of various albuminous substances. As a most important principle in conducting these experiments, the speaker laid down the maxim that the albuminous substance to be examined should not be administered in too large quantities. It was only with very small doses that the alimentary value of the different albuminous substances beside the same nourishment free of nitrogen could be determined. The dog was used for the purpose of the experiment. The proteine substances compared were: the albumen of lentils, that of lupines, that of gluten, and caseine. In the normal feeding, which regularly alternated with that of the albumen to be tested, the proteine of nourishment was imparted in the form of flesh-meal. The result of the long and laborious experiments was that the alimentary value of the albumen of lentils and that of gluten were each found to be equivalent to that of flesh-meal. That is to say, when to the food (which, apart from the additions to be specified, was the same in all the different cases) there were added equal quantities of albuminous nitrogen—in one case in the form of flesh-meal, in another in the form of gluten, and in a third in the form of lentils—in each such case a quantity of nitrogen was developed, and therefore a quantity of albumen withdrawn from the nourishment, which was equal in all three. The albumen of lupines had a lower alimentary value than the albumen of flesh-meal, seeing that from the lupines more albumen was decomposed than from the flesh-meal. Finally, from caseine, less albumen was decomposed, and therefore more was absorbed by the body and utilised, than in the case of any of the other albuminous classes. By means of this investigation two facts of general importance were established: first, it was ascertained that by changing the species of albumen employed by way of nourishment, a better utilisation of the nutritive albumen was obtained, *i.e.* less albumen was decomposed, than if one and the same species of albumen were given for a long period; second, the paradoxical observation was made that during lactation, when the animal made use of a large quantity of albumen for the formation of milk, more of the albumen administered in the food passed away in waste than would have been the case in the same circumstances at a time of non-lactation. The following explanation of these phenomena was given by the speaker. During lactation the animal used a certain quantity of albumen for the milk. The albumen of milk, as was known, was caseine. This caseine was not, however, administered in the food, but had first to be produced from the nutritive albumen (the various species of albumen being chemically different. Now, from the nutritive albumen only certain groups of molecules could be utilised for the formation of caseine. Far more albumen must therefore be decomposed than corresponded with the quantity of nitrogen in the caseine. Hence, therefore, the greater decomposition and the less utilisation of the albumen of the nourishment. Nor was the albumen which the animal needed for incorporation with the body offered to it in the albumen of the nourishment, but the albumen taken by the body was built up from the constituents of the albumen of the nourishment. If only one kind of albumen was given to the animal, it required to decompose a large quantity in order to obtain sufficient constituents for the albumen appropriated by the body. If, on the other hand, different sorts of albumen were given in the food, then the animal decomposed on the whole a less percentage, seeing that in the differently composed albuminous substances it sooner found the different molecular groups which it needed for the building-up of the albumen of the body.

BOOKS, PAMPHLETS, and SERIALS RECEIVED

Records of the Geological Society of India, vol. xx.—The A B C of Photography, 22nd edition (London Stereoscopic Company).—The Perfect Way, or the Finding of Christ, 2nd edition: Kingsford and Maitland (Field and Tuer).—English Tobacco Culture: E. J. Beale (Marlborough).—Through the Fields with Linnæus, 2 vols.: F. Caddy (Longmans).—Report of the Meteorological Council of the Royal Society for the year ending March 31, 1886 (Eyre and Spottiswoode).—Quarterly Weather Report, part 2, April-June, 1878 (Eyre and Spottiswoode).—Monthly Weather Report, September 1886 (Eyre and Spottiswoode).—Report of the Third Meeting of the International Meteorological Committee, held at Paris, September 1885 (Eyre and Spottiswoode).—Scalelia Chemica: a Series of Aids for Beginners in Chemistry; Part 1, Analysis of Simple Salts: H. Adrian (Lewis).—Genesis of the Elements: W. Crookes.—The House in Relation to Public Health: J. B. Russell (Anderson, Glasgow).—Descriptive List of Anthropometric Apparatus (Cambridge Scientific Instrument Company).—Annalen der Physik und Chemie, No. 3, 1887 (Barth, Leipzig).—Journal of Physiology, vol. viii. No. 1 (Cambridge).

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